

RISK MANAGEMENT

AT THE

EUROPEAN SPACE AGENCY - 2005

AN OVERVIEW

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1. Recent ESA risk management initiatives

Risk Management introduced at ESA corporate level in 2001 as a requirement (ESA / ADMIN (2001) 2)

The ESA risk management policy is under revision.

Internal training courses on risk management are hold.

The ECSS standard on risk management is M-00-03. A draft level 3 standard on safety risk assessment is on hold. There is a new standard Q-20-04 on critical item control.

ESA - TEC-Q (PA & Safety Dept.) activities include:

- PRA pilot application to ISS payloads in support of the PSRP,
- Definition of draft format & methodology for risk assessment:

1. Recent ESA risk management initiatives (continued)

Risk Domain: 									
RISK IDENTIFICATION			RISK ASSESSMENT			RISK RANKING			RISK REDUCTION & ACCEPTANCE
Risk Scenario: Cause - Events - Consequence			Severity	Likelihood	Risk Index	Risk Horizon	Risk Victim	Rank of risk	Risk Owner Action / Status
									Acceptance of residual risk. Trend:
			High	Medium	High	Short term			
			High	Low	Low	Medium term			
			Medium	Medium	Medium				
			High	Medium	High	Medium term			

2. Examples of risk management implementations

CDF is the ESA - Concurrent Design Facility

- Risk management is implemented on all CDF projects
- CERIS is the new CDF risk management workstation:

CERIS

CERIS USER GUIDE

SAFETY & MISSION SUCCESS" RISK MANAGEMENT WORKBOOK

PROJECT:

NAME OF RISK EXPERT:

IMPORTANT USER INFORMATION

No rows or columns may be added to the spreadsheets as this may affect embedded formulas and/or calculations.

CELL FORMAT INFORMATION

Cells that look like this are automatically generated by embedded formulas or grey buttons

Cells that look like this require input from the risk analyst

BUTTON FORMAT INFORMATION

BUTTONS THAT LOOK LIKE THIS ALLOW ACCESS TO THE CERIS USER GUIDE

BUTTONS THAT LOOK LIKE THIS ALLOW THE USER TO NAVIGATE WITHIN AND BETWEEN WORKSHEETS

BUTTONS THAT LOOK LIKE THIS CALCULATE AND SORT RISK ASSESSMENT DATA

"SAFETY & MISSION SUCCESS" - RISK MANAGEMENT

[Go to Sub-System Risk Assessment](#)
[Go to Mission Phase Risk Assessment](#)

STEP 2: RISK IDENTIFICATION & ASSESSMENT

[CEPIS USER GUIDE - INTRO TO STEP 2](#)

SCOPE OF OVERALL RISK IDENTIFICATION & ASSESSMENT

Overall risk posed by scenarios leading to top consequence (tick and specify):

<input type="checkbox"/>	Loss of life:	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Loss of life & mission:	<input type="checkbox"/>
<input type="checkbox"/>	Loss of mission:	<input type="checkbox"/>
<input type="checkbox"/>	Other:	<input type="checkbox"/>

RESULTS OF OVERALL RISK ASSESSMENT

Magnitude of overall risk posed by all scenarios (likelihood of top consequence per mission):

upper	0.455	OVERALL RISK	
lower	0.000		
POTENTIALITY	0.052		

[CEPIS USER GUIDE - OVERALL RISK](#)

RESULTS OF MISSION PHASE ASSESSMENT (To be completed once the sub-system scenarios have been identified below.)

Magnitude of risk posed per mission phase (likelihood of top consequence per mission):

[CLICK HERE ONCE TO CALCULATE THE INDIVIDUAL MISSION PHASE RISK CONTRIBUTIONS](#)

[Back to the Top](#)

Phase Risk Contribution	Phase Risk Contribution	Phase Risk Contribution
upper 0.004	upper 0.113	upper 0.000
lower 0.000	lower 0.000	lower 0.000
Potentiality 0.001	Potentiality 0.012	Potentiality 0.000

[CEPIS USER GUIDE - MISSION PHASES](#)

2. Examples of risk management implementations (continued)

Galileo is Europe's novel satellite navigation system for advanced global civil positioning services



- Risk management is implemented on the Galileo programme and the System Test Bed V2 (GSTB-V2) project



- Use of the “risk management information system”

3. Risk management on ESA science projects

- Scientific programme is the only mandatory programme at ESA
→ Risk management is a vital element to ensure the budget is used adequately
- Structured risk management approach introduced in D/SCI in 2000 and coherent with corporate approach
- Qualitative risk management used in D/SCI (compliant with ECSS & ISO standards)
- Similar approach used by NASA on collaborative projects (e.g. Cassini-Huygens, JWST)

Cosmic Vision 2020

Cluster



Ulysses

SOHO

Solar Helio
Obs

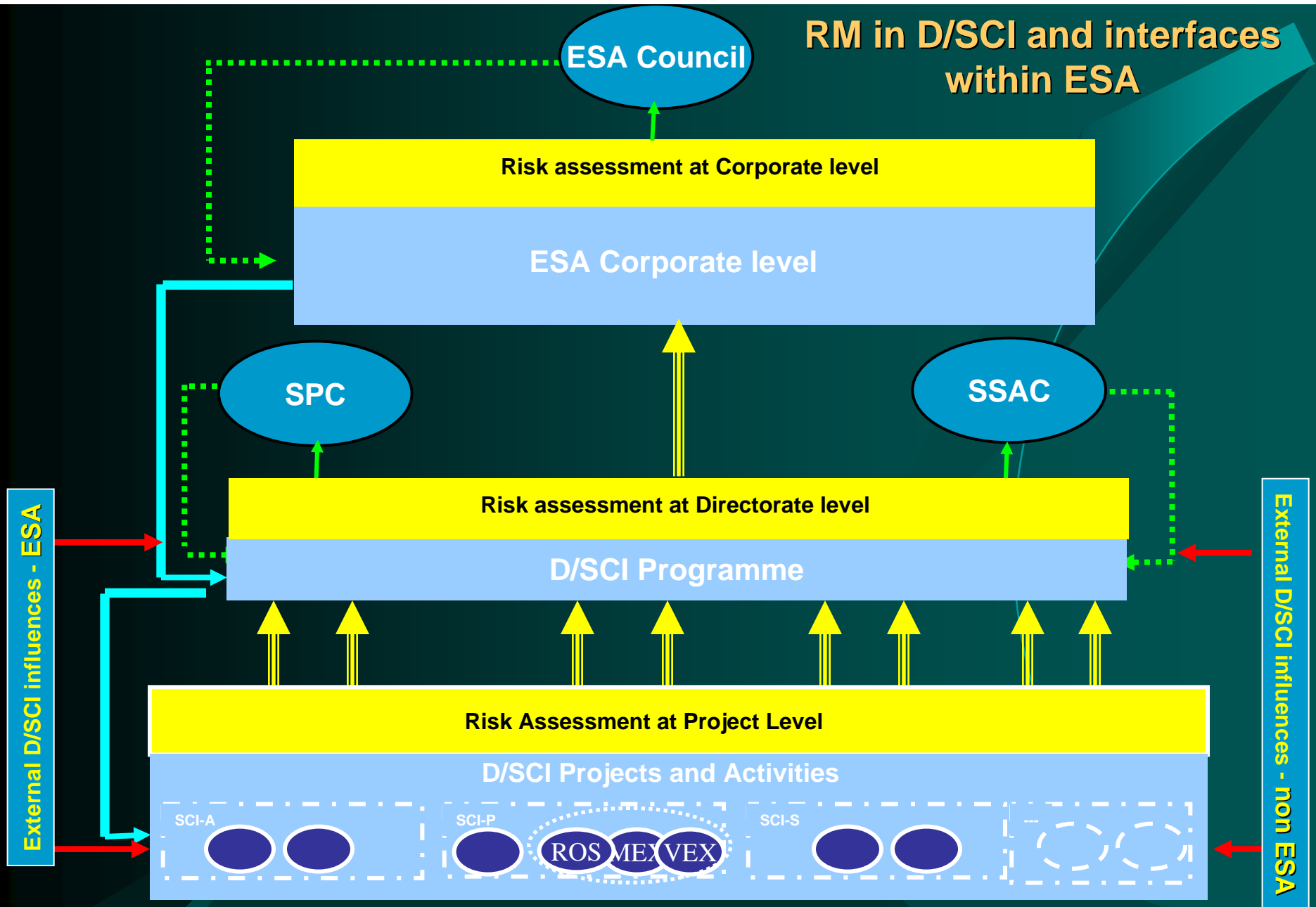
Sola

HST

XMM-Newton

ysics

RM in D/SCI and interfaces within ESA



Risk management tool & documentation


“Risk Management Information System” RMIS:

- Implemented in 2002 on scientific projects, multi user database, web based.
- Supports the whole “risk management process” (identification of risks, rating and ranking , assignment of mitigation actions / actionees / action dates, and monitoring/communication of risks and of corrective actions planned).



- Tracking evolution of risks per project, along whole project life-cycle.
- Providing a basis for a cross-projects knowledge management data base.

Risk management tool & documentation (continued)

Risk Management System 

PMIS Home

Project:

Review Date: 08-SEP-04

Functions:

- All Risks
- Search
- New Risk

Reports:

- Ranked Risk Log
- Comparative Risk
- Risk Register
- Evolution Report
- Risk Index Scheme
- Distribution Report

Administration:

- Projects/Groups
- Sources
- Domain

Help

- User Guide

All Risks:

No	Title	Index	Source	Domain	Status	Review	Action
01-05.00.00	Integration and test	3C	Module, AIT	S, T	ON Progress	08-SEP-04	More Info
01-10.00.00	Product development of 4 SVM models leading to delays in delivery and performance of the mission	4D	Module, Managerial	S, T	ON Progress	08-SEP-04	More Info
01-01.00.00	Control public not aware of the mission	4D	Module		ON Progress	08-SEP-04	More Info
01-01.00.00	Need to modify SVM architecture	3C	Module		ON Progress	08-SEP-04	More Info
01-01.00.00	RCS test delays and integration	3D	Module	S	ON Progress	08-SEP-04	More Info
01-02.03	Thermal interface between payload and instruments problematic	1A	Module	S, T	In Progress	08-SEP-04	More Info
02-05.00.00	Late validation of delivery of AIT'S	4D	Subsystem, AIT	S, T	In Progress	08-SEP-04	More Info
02-05.00.00	Failure in propulsion system diagnosed at critical path	3B	Subsystem, AIT	S, SV, T	In Progress	08-SEP-04	More Info
02-02.00.00	Low accuracy of the payload map	4D	Subsystem	SV	ON Progress	08-SEP-04	More Info
02-02.00.00	Low accuracy of the payload map	4D	Subsystem	SV	ON Progress	08-SEP-04	More Info

3. Mitigate

RISK REGISTER : PM VIEW

Rank	Nbr	Risk Scenario	Impact	Status (C,IP)	Comments	Action(s)
1	07.00.01	Loss of payload if	SE	C, S, SV	IP	For the mission, the payload is the most critical element. The mission will be lost if the payload is lost.
1	07.00.02	Loss of payload if	SE	S, T	IP	Currently, the payload is the most critical element. The mission will be lost if the payload is lost.
1	10.00.09	Loss of payload if	SE	C	IP	Currently, the payload is the most critical element. The mission will be lost if the payload is lost.
1	07.00.03	Loss of payload if	SE	C, S	IP	Currently, the payload is the most critical element. The mission will be lost if the payload is lost.
2	06.01.04	Loss of payload if	SE	S, SV, T	IP	Currently, the payload is the most critical element. The mission will be lost if the payload is lost.

4. Report

Distribution Chart

Project:

Total distribution of risk items

Risk Level	Count
High	32
Medium	37
Low	31
Very Low	33

Distribution of high risk items

Risk Level	Count
High	13
Medium	10
Low	10
Very Low	10

Distribution of medium risk items

Risk Level	Count
High	18
Medium	19
Low	12
Very Low	26

Distribution of low risk items

Risk Level	Count
High	7
Medium	6
Low	12
Very Low	10

New risk management initiatives in the science directorate

- Enhancement of RMIS to reflect different views (team, project manager, head of department etc.) and ease reporting at all levels.
- “Qualitative” approach complemented with a “quantitative” approach to quantify cost and schedule impacts and plan consequently contingencies.
- Link between the future “lessons learned database” and the “risk management database”.

Risk management and “lessons learned”

Lessons Learned are part of ESA's reviews output

1. RMIS ➡ Lessons learned: to capitalise for the future on negative or positive RM experience on current / recently accomplished projects and generate “best practices”.
2. Lessons learned ➡ RMIS: based on lessons learned from projects in the past, help prevent current risks from becoming problems (create a checklist to be used at the beginning of the project).

4. Conclusion

There is growing awareness of the need for risk management at ESA:

- Risk management is implemented on most ESA projects (Risk Assessments required from ESA contractors).
- Quantification of costs of risks is major step to forecast contingencies in a harsh economic environment.